

MEMORANDUM

To: Ms. Rebecca Chu, EPA
From: Ryan Barth, P.E., Anchor QEA, LLC
Amy Essig Desai, Farallon Consulting, LLC
Cc: Gil Leon, Earle M. Jorgensen Company
Miles Dyer, Jorgensen Forge Corporation
Bill Joyce and Ian Sutton, Joyce Ziker
Parkinson, PLLC
Jeff Kray, Marten Law
Chris Schraff, Porter Wright
Ravi Sanga, EPA
Holly Arrigoni, EPA
Maureen Sanchez, Ecology
Will Ernst, The Boeing Company
Tom Colligan, Floyd Snider
Philip Spadaro, The Intelligence Group
Re: Jorgensen Forge Early Action Area Removal Action
Addendum to the Final Basis of Design Report
Administrative Order on Consent, EPA Docket No. CERCLA 10-2013-0032

Anchor QEA, LLC prepared this memorandum on behalf of Earle M. Jorgensen Company (EMJ) to provide additional information to update the *Basis of Design Report – Jorgensen Forge Early Action Area* (BODR) that was prepared by Anchor QEA and approved by the U.S. Environmental Protection Agency (EPA) on August 16, 2013. Following EPA's approval, additional information that impacts the BODR became available associated with the directly adjacent Jorgensen Forge Outfall Site (JFOS) that is being managed under a separate *Administrative Order on Consent for Removal Action* (AOC; CERCLA Docket No. 10-2011-0017¹) between EPA, Jorgensen Forge, and The Boeing Company (Boeing). This letter summarizes the following additional information to update the BODR:

- Background of relationship between JFOS and directly adjacent Jorgensen Forge Early Action Area Removal Action (EMJ Removal Action)

¹ U.S. Environmental Protection Agency, 2011. *Administrative Order on Consent for Removal Action*. CERCLA Docket No. 10-2011-0017.

- Additional angled Geoprobe data collected within the JFOS-Impacted Material Area (formerly called the “blue wedge”)
- EPA-approved Jorgensen Forge/Boeing JFOS-Impacted Material Area containment barrier wall alignment design to be constructed pursuant to the JFOS AOC
- EMJ dredge design within the in-water containment barrier wall (cofferdam) to be performed pursuant to the EMJ Removal Action

BACKGROUND

Section 2.2.2.1 of the BODR described elevated concentrations of polychlorinated biphenyls (PCBs) that were identified within an inactive Boeing 12-inch storm pipe and directly adjacent inactive 24-inch property line storm pipe (collectively referred to as the property line storm pipes), as well as in soils underlying these pipes near the discharge location within the JFOS (see Figure 2 of Attachment 1). The BODR also described that pursuant to the *Action Memorandum for the Jorgensen Forge Outfall Site, Seattle, King County, Washington*² and the AOC, Boeing cleaned and closed the concrete portions of the property line storm pipes to remove and prevent continued discharge of stormwater through known PCB contamination to the Lower Duwamish Waterway (LDW). As part of the removal action and closure activities, Boeing also completed soil sampling along the top of the shoreline bank area in the vicinity of the corrugated metal pipe (CMP) portions of the property line storm pipes. This investigation identified elevated PCB concentrations in soil at depths from 8 to 25 feet below ground surface (bgs) within the JFOS.

Due to the elevated PCB concentrations in soil, EPA required additional investigation under a First Modification to the AOC³. This additional investigation included a high density of Geoprobe soil borings along the general alignment of the CMP portions of the property line storm pipes adjacent to the top-of-bank area within the JFOS. This additional investigation also included the advancement of a single angled Geoprobe that extended under the shoreline bank into the directly adjacent EMJ Removal Action Boundary (RAB; Figure 3 of Attachment 1). The results of the additional investigation identified PCBs at elevated PCB concentrations down to 32 feet bgs, including under the shoreline bank within the RAB.

² U.S. Environmental Protection Agency, 2010. *Action Memorandum for the Jorgensen Forge Outfall Site, Seattle, King County, Washington*. September 30, 2010.

³ U.S. Environmental Protection Agency, 2012. *Jorgensen Forge outfall Site First Modification for Administrative Order on Consent for Removal Action*. CERCLA Docket No. 10-2011-0017. March 23, 2012.

Some depth intervals included PCB concentrations that exceed the 50 milligram per kilogram (mg/kg) Toxic Substances Control Act (TSCA) threshold, which triggers hazardous waste disposal requirements. This data was presented in Figure 3 of the BODR.

ADDITIONAL ANGLED GEOPROBE SOIL DATA

Following EPA approval of the BODR in August 2013, Boeing and Jorgensen Forge conducted the additional investigation which included advancing four additional angled (30 degrees from vertical) Geoprobe soil borings within the JFOS under the Second Modification to the AOC⁴ and in accordance with the *Basis of Design Report – Second Modification for the Administrative Order on Consent for Removal Action, Jorgensen Forge Outfall Site, Phase 4A/Shoreline Containment Barrier*⁵. The objectives of the additional investigation were to further characterize the vertical and lateral extents of elevated PCBs below the northwest corner of the RAB due to releases of PCBs from the property line storm pipes. Jorgensen Forge's consultant SoundEarth Strategies, Inc. managed performance of the sampling on October 8, 2013. The Geoprobe boring locations are depicted on Figure 3 of Attachment 1 and the data is presented in Attachment 2. A detailed summary of the soil data is provided in the *Data Report of Soil Quality Angle Boring Results – Second Modification for the Administrative Order on Consent for Removal Action, Jorgensen Forge Outfall Site, Phase 4A/Shoreline Containment Barrier*⁶.

Following completion of the additional investigation, on November 5, 2013, Rebecca Chu of EPA submitted an electronic email to EMJ stating that any required additional removal within the RAB based on the additional angled Geoprobe soil data will be performed by EMJ and any required upland soils removal directly adjacent/outside the RAB within the JFOS will be performed by Jorgensen Forge.

⁴ U.S. Environmental Protection Agency, 2013. *Jorgensen Forge Outfall Site Second Modification for Administrative Order on Consent for Removal Action*. CERCLA Docket No. 10-2011-0017. May 16, 2013.

⁵ Sound Earth Strategies, Inc., 2013. *Basis of Design Report – Second Modification for the Administrative Order on Consent for Removal Action, Jorgensen Forge Outfall Site, Phase 4A/Shoreline Containment Barrier*. Prepared for: U.S. Environmental Protection Agency. Prepared on behalf of: Jorgensen Forge Corporation and The Boeing Company. December 5, 2013.

⁶ Sound Earth Strategies, Inc., 2013. *Data Report of Soil Quality Angle Boring Results – Second Modification for the Administrative Order on Consent for Removal Action, Jorgensen Forge Outfall Site, Phase 4A/Shoreline Containment Barrier*. Prepared for: U.S. Environmental Protection Agency. December 20, 2013.

JFOS-IMPACTED MATERIAL AREA CONTAINMENT BARRIER WALLS

The abutting RAB and JFOS cleanup boundaries are presented on Figure 4 of Attachment 1. These boundaries are defined by the JFOS-Impacted Material Area containment barrier wall alignments identified in the Jorgensen Forge final design letter to EPA dated January 20, 2013 prepared by The Intelligence Group. The JFOS Second Modification to the AOC requires that Boeing/Jorgensen Forge construct these containment barrier wall(s) between the RAB and JFOS to facilitate removal of PCB-contaminated shoreline bank material due to releases from the property line storm pipes. EPA's letter to Boeing and Jorgensen Forge, dated January 23, 2014, approved the containment barrier wall alignments shown in Figure 4 of Attachment 1 and required the in-water portion of the alignment to be constructed by March 7, 2014, to eliminate the potential for delays to the EMJ Removal Action. If the in-water containment barrier (cofferdam) installation cannot be completed by March 7, 2014, then construction of a top-of-bank containment barrier alignment is required to commence by April 1, 2014.

EMJ REVISED DREDGE DESIGN

Anchor QEA compared the additional Geoprobe soil data within the RAB (east of the containment barrier wall) to the EPA-identified total PCB removal action level (RvAL for the EMJ Removal Action (12 mg/kg normalized for organic carbon [OC] content when OC ranges between 0.5 to 4 percent; compared to 240 mg/kg outside that OC range). As shown in Attachments 1 and 2, RvAL exceedances exist within the RAB east of the containment barrier wall in borings JFOS-BH03, JFOS-BH04, and JFOS-BH05 at variable depths bgs between approximately 0 feet mean lower low water (MLLW) elevation and -15 feet MLLW. Total PCB concentrations greater than the TSCA threshold exist from approximately 0 feet MLLW to -11 feet MLLW. These TSCA materials will be segregated and disposed in a permitted Subtitle C disposal facility in accordance with TSCA regulations and the EPA-approved EMJ Removal Action Specifications.

To maintain consistency with the removal action objectives presented in the BODR, Anchor QEA developed a revised dredge design within the northwest corner of the RAB to remove all sediment/soil total PCB concentrations greater than the RvAL. Anchor QEA submitted the revised dredge design drawings to EPA on December 19, 2013, which reflected the top-of-bank containment barrier wall alignment. The revised dredge design drawings submitted

to EPA on December 19, 2013 did not include the in-water containment barrier wall alignment. Figures 8a, 8b, and 8c in Attachment 1 show the revised dredge prism within the in-water containment barrier wall alignment. The EMJ Removal Action Construction Specifications have been revised to reflect the revised dredge design, revised contractor bids for removal within the in-water containment barrier have been received, and EMJ is currently finalizing contractor selection.

The EMJ-selected contractor will perform the removal within the in-water containment barrier using equipment staged from the waterside. As outlined in the Jorgensen Forge final design letter to EPA dated January 20, 2014, no surcharge is allowed along the top-of-bank areas during removal of the material within the cofferdam. The contractor will utilize the same best management practices identified in the EPA-approved BODR. EMJ will ensure the removal achieves the revised dredge design elevations through performance of post-dredge surveys. Consistent with the procedures identified in the EPA-approved BODR, materials removed with total PCB concentrations below the TSCA threshold will be placed on watertight haul barges and excess water will be conveyed to the on-water treatment system used for the remainder of the EMJ Removal Action dredging. Any removed materials with total PCBs that exceed the TSCA threshold will be placed into lined containers staged on a haul barge. Any excess water in the containers will be conveyed to the on-water treatment system that will be amended to include additional carbon filtration units prior to discharge back to the LDW. Additional information regarding the TSCA materials handling procedures will be provided in the Removal Action Work Plan, which will be submitted to EPA for review in early April. The material on the haul barges will then be transported to the EPA-approved transloading facility for transport via truck or rail to an offsite disposal facility permitted to receive those materials.

Based on communications with EPA, EMJ understands that there are no additional permitting, water quality monitoring, and sediment sampling requirements associated with the additional removal beyond EPA's current approvals.

Based on evaluation of the current EMJ Removal Action long-term schedule, EMJ can achieve EPA's required in-water construction initiation on August 1, 2014, if Boeing/Jorgensen Forge install the cofferdam by March 7, 2014, or the back-up top-of-bank alignment by July 1, 2014. EMJ will continue close communications with Boeing and

Jorgensen Forge to coordinate the anticipated schedule for completion of the EMJ Removal Action activities within the cofferdam and Boeing/Jorgensen Forge's subsequent removal of the cofferdam immediately following those activities. The exact sequencing and schedule will be determined following execution of a contract between EMJ and the selected contractor.

Attachment 1 presents revised BODR figures that incorporate the revised containment barrier alignment and the additional Geoprobe soil data. Attachment 2 presents the Phase 4a Geoprobe soil data.

ATTACHMENT 1

REVISED BODR FIGURES

K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-P Property dwg Figure 2

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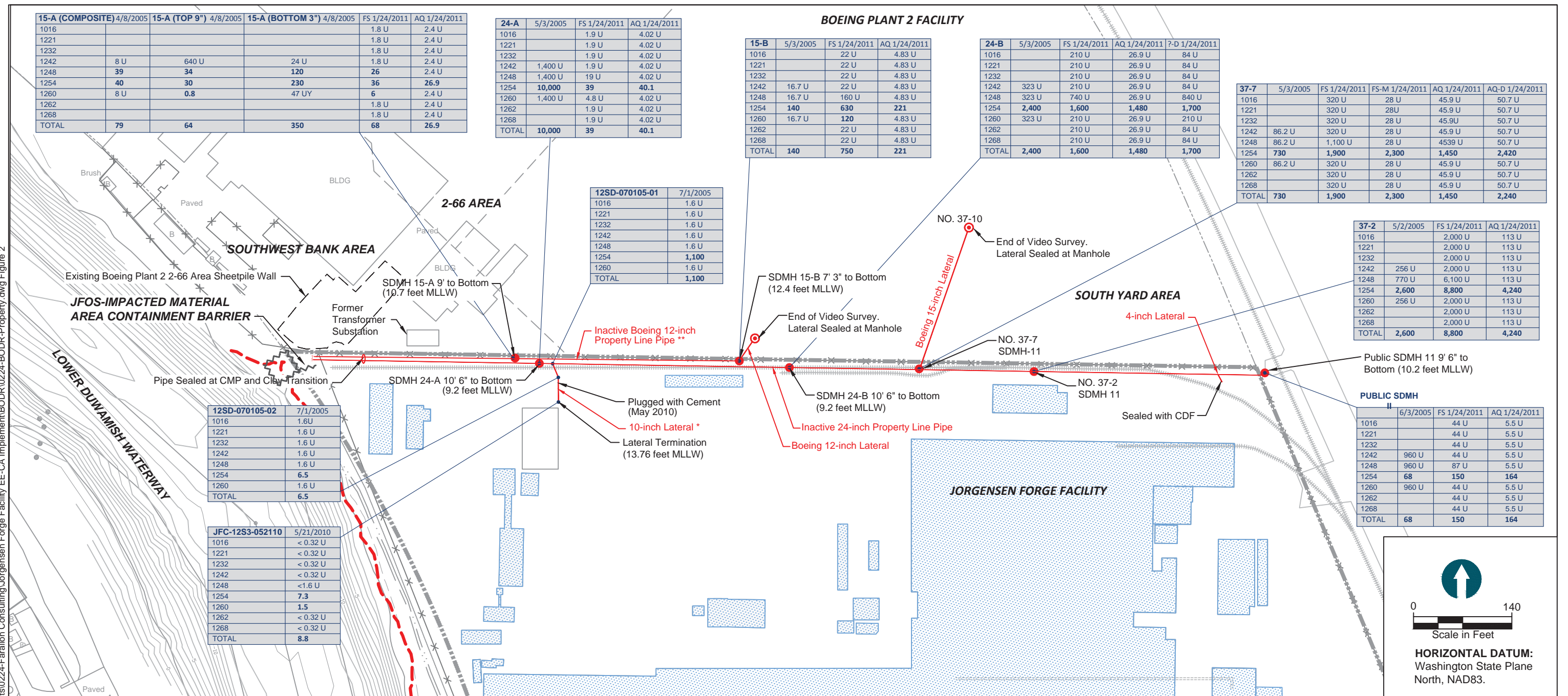


Figure 2
Property Line Pipe/Manhole Solids PCB Concentrations
Basis of Design Report
Jorgensen Forge Early Action Area



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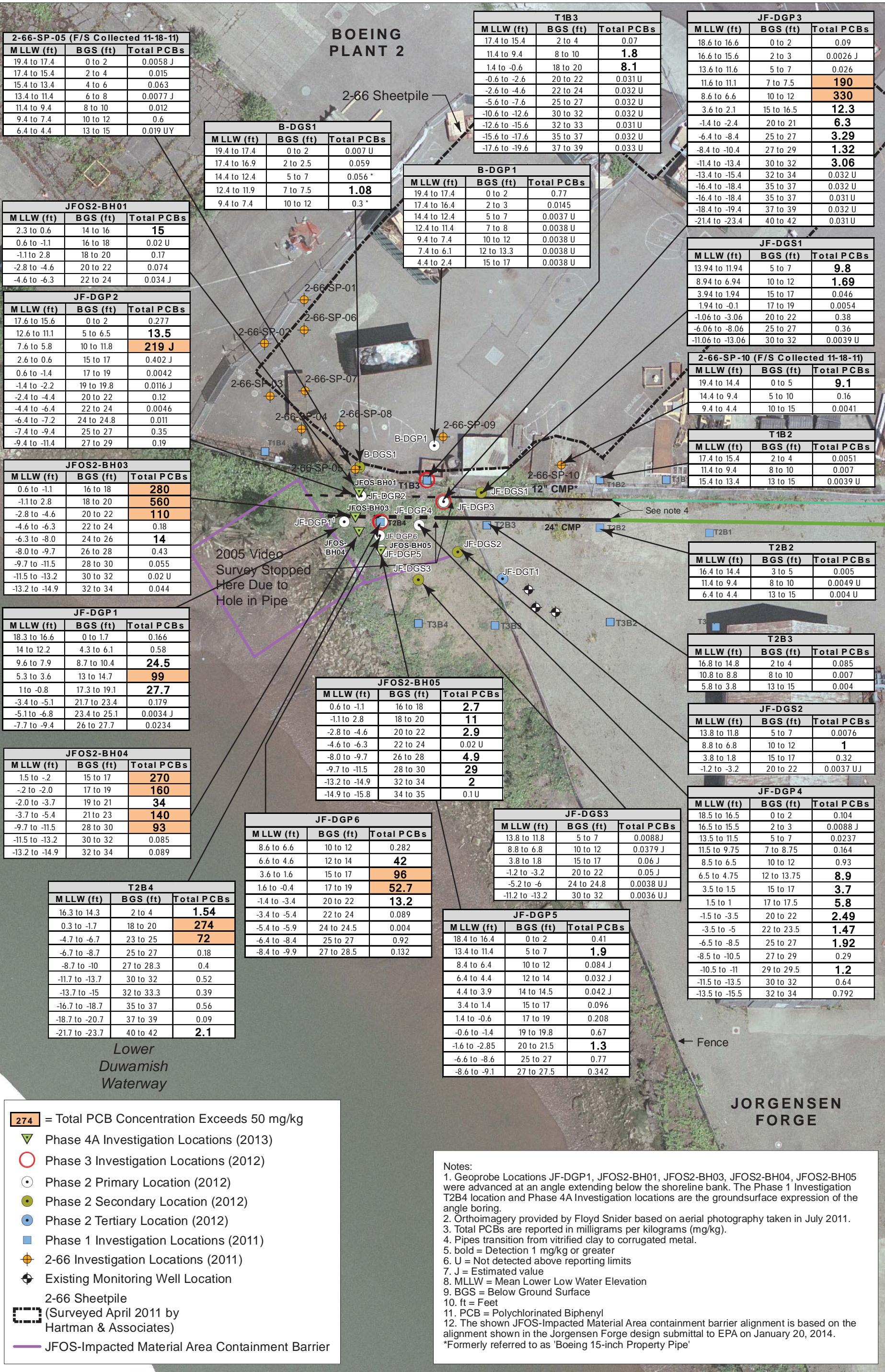
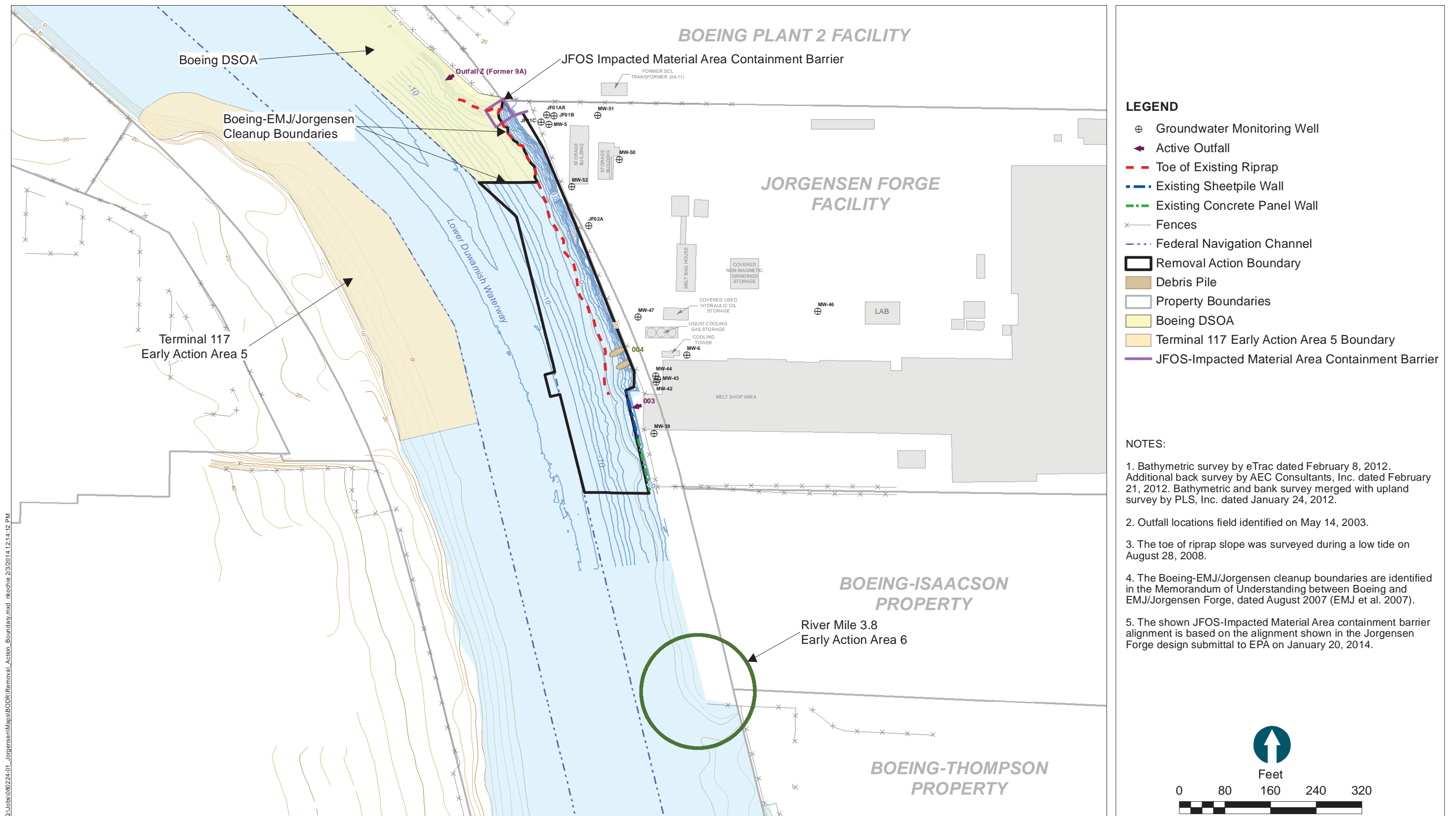
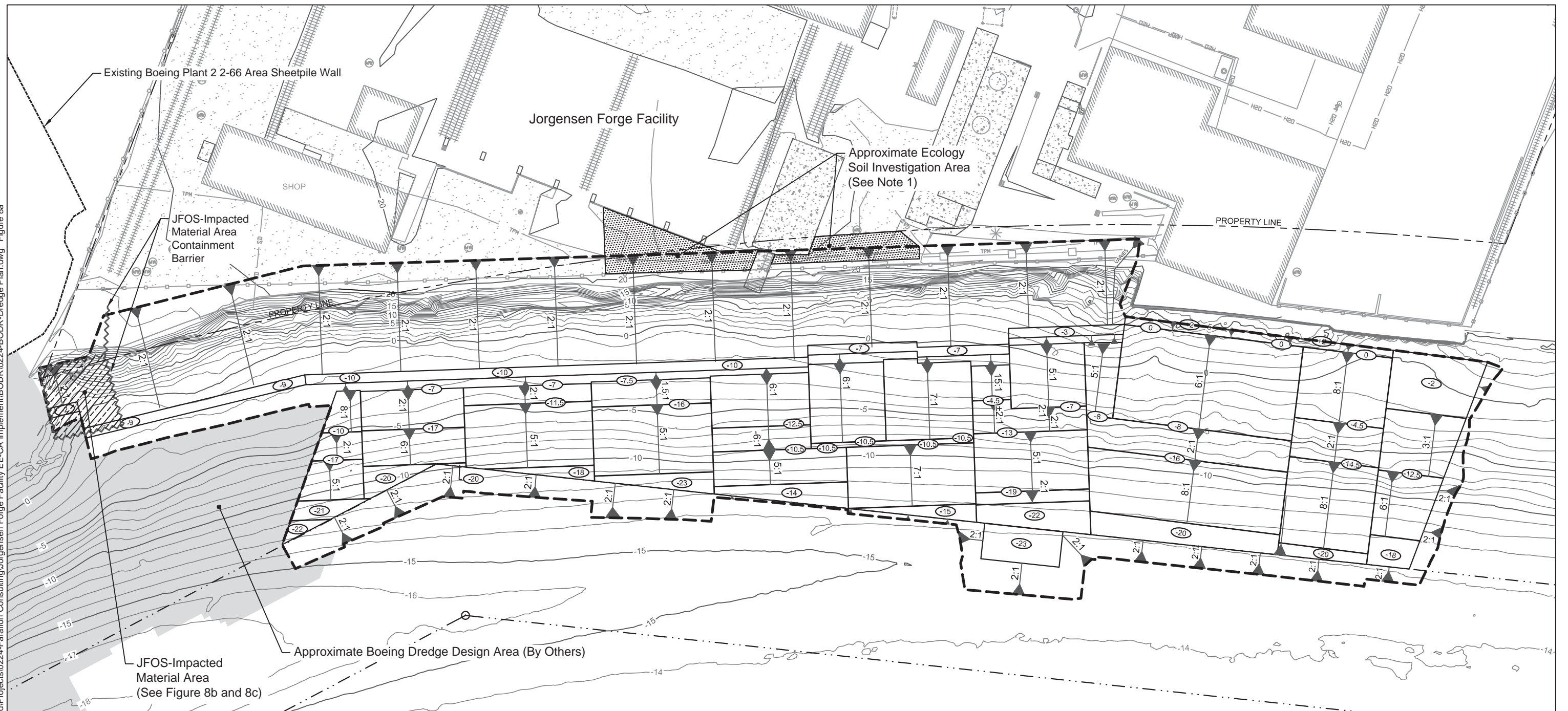


Figure 3
Soil Total PCB Concentrations
Basis of Design Report
Jorgensen Forge Early Action Area

Q:\Jobs\080224-01_Jorgensen\Maps\BODR\Removal_Action_Boundary.mxd rkochie 2/3/2014 12:14:12 PM



Jan 23, 2014 6:30pm tgriga \\Galacal\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\BODR\0224-BODR-Dredge Plan.dwg Figure 8a



HORIZONTAL DATUM: Washington State Plane North, NAD83.

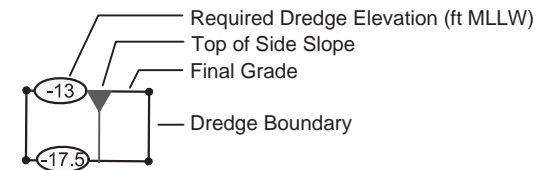
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES:

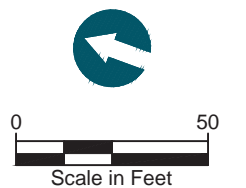
1. Jorgensen Forge has removed additional soil and backfilling along the top of bank area surrounding soil borings SB-3 and SB-4 to remove relatively elevated concentrations of polychlorinated biphenyls. This work was not performed under the EPA scope of work but rather as an Independent Action under the existing Ecology Agreed Order (No. DE 4127) at the facility.
2. The JFOS-Impacted Material Area containment barrier to be installed by Jorgensen Forge/Boeing under a separate EPA AOC to address releases of PCBs from the Property Line Pipes.
3. The shown JFOS-Impacted Material Area containment barrier alignment is based on the alignment shown in the Jorgensen Forge design submittal to EPA on January 20, 2014.

LEGEND:

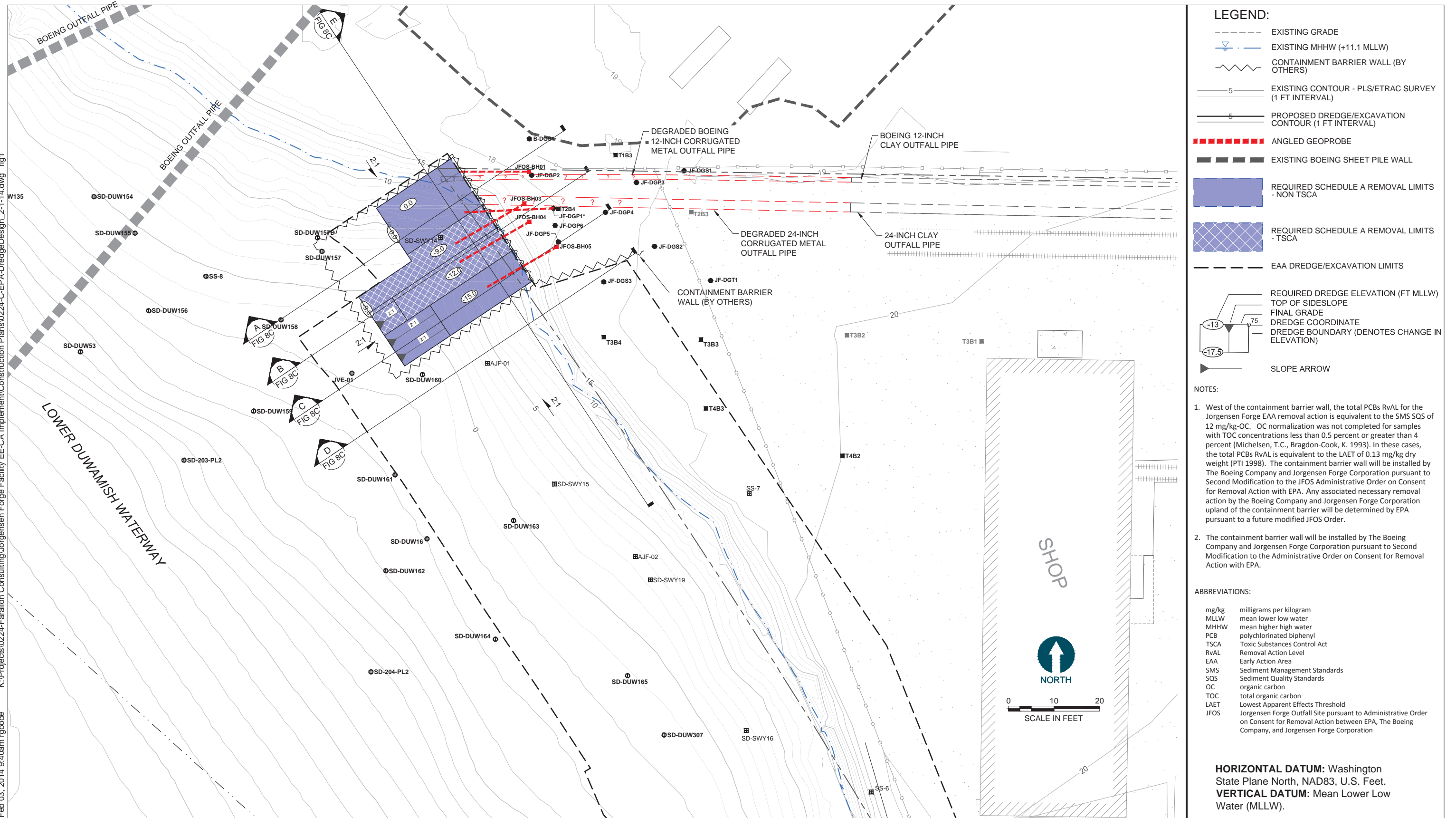
- Navigation Channel
- Existing Bathymetry (1 ft interval)
- Existing Fence Line



- Dredge/Excavation Limits
- ▲ Slope Arrow
- ▨ JFOS- Impacted Material Area



Feb 03, 2014 9:40am rgoode K:\Projects\0224-Farallon Consulting\Jorgensen Forge Facility EE-CA Implement\Construction Plans\0224-C-EPA-DredgeDesign_2-1-14.dwg fig1



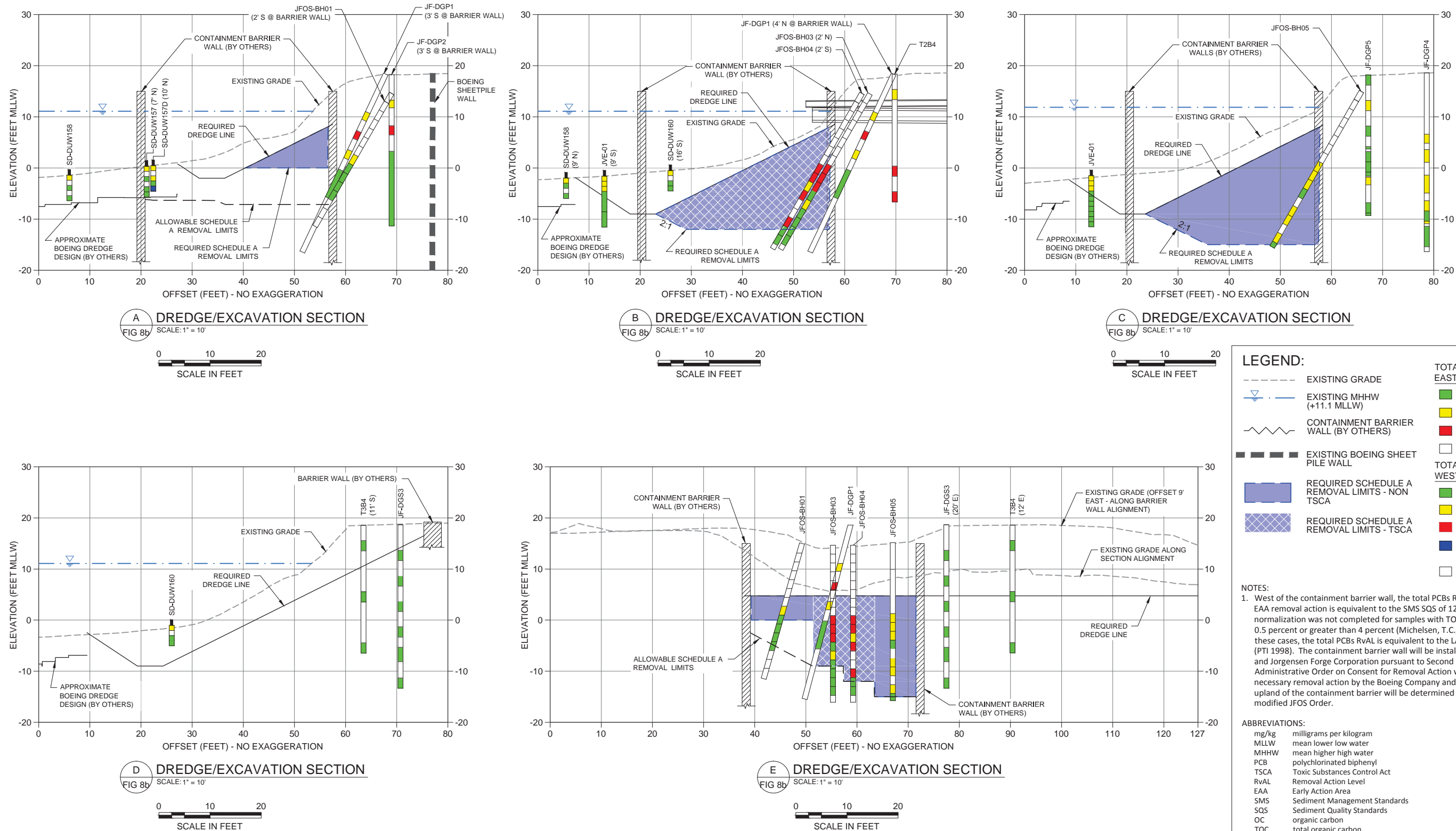
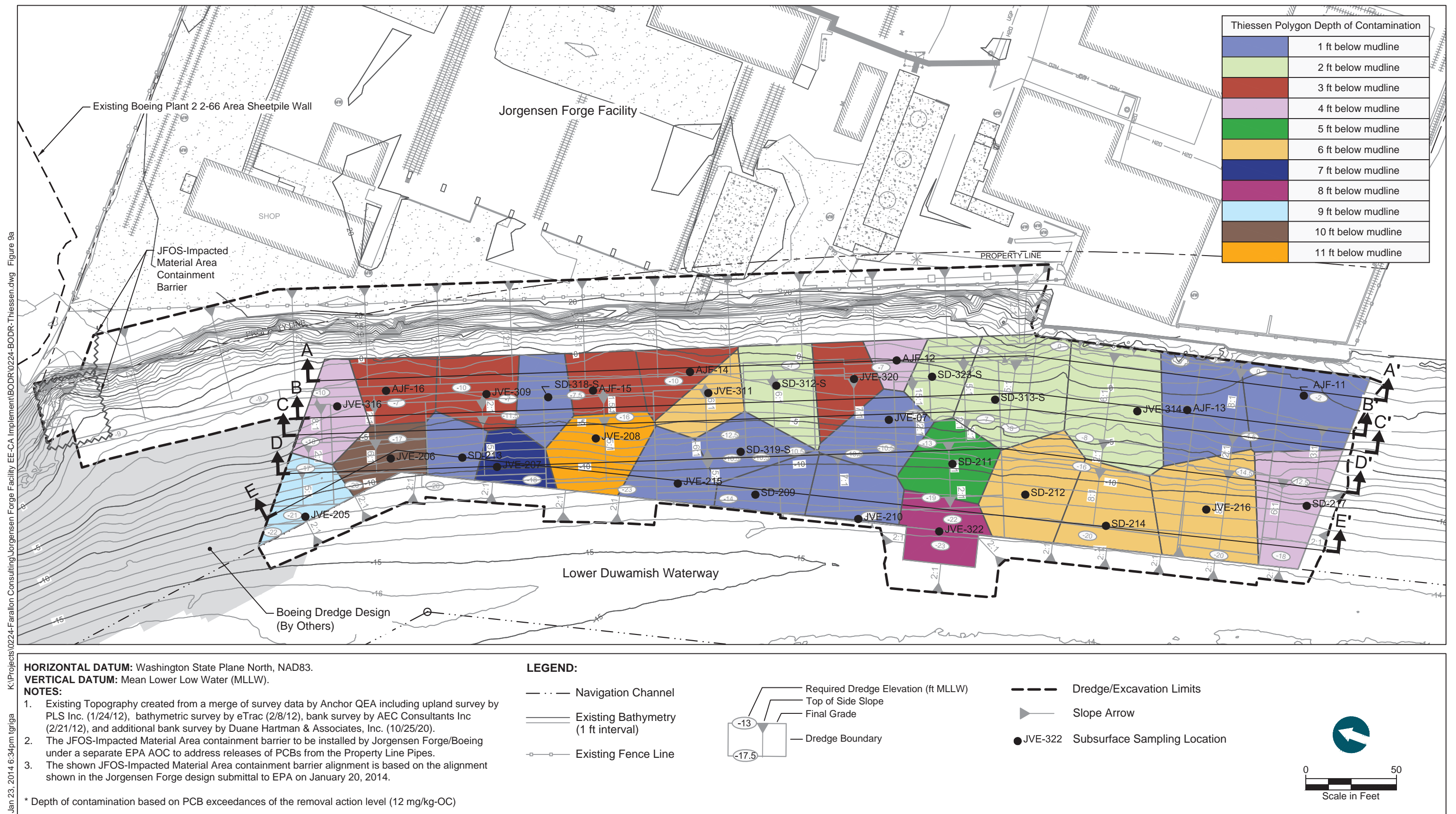


Figure 8c
JFOS Impacted Material Area Cross-Sections
Basis of Design Report
Jorgensen Forge Early Action Area



ATTACHMENT 2
PHASE 4A GEOPROBE SOIL DATA

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS
 JORGENSEN FORGE OUTFALL SITE
 SECOND MODIFICATION, PHASE 4A
 SEATTLE, WASHINGTON
 CERCLE DOCKET NO. 10-2011-0017

APPROX. ELEV. (feet MLLW)	ANGLE BORING ID JFOS2-BH01			ANGLE BORING ID JFOS2-BH03			ANGLE BORING ID JFOS2-BH04			ANGLE BORING ID JFOS2-BH05			APPROX. ELEV. (feet MLLW)
	SOIL SAMPLE ID	TOTAL PCBs ⁽¹⁾ (mg/kg dw)	OC- NORMALIZED TOTAL PCBs (mg/kg OC)	SOIL SAMPLE ID	TOTAL PCBs ⁽¹⁾ (mg/kg dw)	OC- NORMALIZED TOTAL PCBs (mg/kg OC)	SOIL SAMPLE ID	TOTAL PCBs ⁽¹⁾ (mg/kg dw)	OC- NORMALIZED TOTAL PCBs (mg/kg OC)	SOIL SAMPLE ID	TOTAL PCBs ⁽¹⁾ (mg/kg dw)	OC- NORMALIZED TOTAL PCBs (mg/kg OC)	
0.6	JFOS2-BH01-16	15	2,300	--	--	--	--	--	--	--	--	--	0.6
-0.2	--	--	--	--	--	--	JFOS2-BH04-17	270	14,000	--	--	--	-0.2
-1.1	JFOS2-BH01-18	<0.02	TOC <0.5% ^(a)	JFOS2-BH03-18	280	11,000	--	--	--	JFOS2-BH05-18	2.7	TOC >4% ^(a)	-1.1
-2.0	--	--	--	--	--	--	JFOS2-BH04-19 (Duplicate)	160	10,000	--	--	--	-2.0
-2.8	JFOS2-BH01-20	0.17	TOC <0.5% ^(a)	JFOS2-BH03-20	560	TOC >4% ^(a)	--	--	--	JFOS2-BH05-20 (Duplicate)	11	300	-2.8
-3.7	--	--	--	--	--	--	JFOS2-BH04-21	34	3,800	--	--	--	-3.7
-4.6	JFOS2-BH01-22	0.074	TOC <0.5% ^(a)	JFOS2-BH03-22	110	3,300	--	--	--	JFOS2-BH05-22	2.9	TOC >4% ^(a)	-4.6
-5.4	--	--	--	--	--	--	JFOS2-BH04-23	140	6,000	--	--	--	-5.4
-6.3	JFOS2-BH01-24	0.034 js	TOC <0.5% ^(a)	JFOS2-BH03-24	0.18	TOC <0.5% ^(a)	--	--	--	JFOS2-BH05-24	<0.02	TOC >4% ^(a)	-6.3
-7.2	--	--	--	--	--	--	--	--	--	--	--	--	-7.2
-8.0	JFOS2-BH01-26	NA	NA	JFOS2-BH03-26	14	TOC <0.5% ^(a)	--	--	--	--	--	--	-8.0
-8.9	--	--	--	--	--	--	--	--	--	--	--	--	-8.9
-9.7	JFOS2-BH01-28	NA	NA	JFOS2-BH03-28	0.43	TOC <0.5% ^(a)	--	--	--	JFOS2-BH05-28	4.9	150	-9.7
-10.6	--	--	--	--	--	--	--	--	--	--	--	--	-10.6
-11.5	JFOS2-BH01-30	NA	NA	JFOS2-BH03-30	0.055	TOC <0.5% ^(a)	JFOS2-BH04-30	93	8,670	JFOS2-BH05-30	29	2,230	-11.5
-12.3	--	--	--	--	--	--	--	--	--	--	--	--	-12.3
-13.2	--	--	--	JFOS2-BH03-32	<0.02	TOC <0.5% ^(a)	JFOS2-BH04-32	0.085	TOC <0.5% ^(a)	--	--	--	-13.2
-14.1	--	--	--	--	--	--	--	--	--	--	--	--	-14.1
-14.9	--	--	--	JFOS2-BH03-34	0.044	TOC <0.5% ^(a)	JFOS2-BH04-34	0.089	TOC <0.5% ^(a)	JFOS2-BH05-34	2.0	TOC <0.5% ^(a)	-14.9
-15.8	--	--	--	--	--	--	--	--	--	JFOS2-BH05-35	<0.1	TOC <0.5% ^(a)	-15.8

NOTES:

- signifies total PCB concentration less than or equal to 1 mg/kg dw, or not detected
- signifies total PCB concentration greater than 1 mg/kg dw
- signifies total PCB concentration greater than the TSCA limit of 50 mg/kg dw
- signifies OC-normalized PCB concentration exceeds the SMS SQS Chemical Criteria of 12 mg/kg OC

BOLD text signifies at least one PCB Aroclor was detected above its laboratory reporting limit

Laboratory analysis by Friedman & Bruya of Seattle, Washington

⁽¹⁾PCBs by EPA Method 8082A

^(a) Michelsen TC, Bragdon-Cook K. 1993. Technical information memorandum: Organic carbon normalization of sediment data. Washington Department of Ecology, Olympia, WA.

LABORATORY DATA QUALIFIERS:

js = The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

ABBREVIATIONS:

-- = sample not recovered from this depth interval
 < = analyte not detected at or above the reporting limit
 EPA = U.S. Environmental Protection Agency
 ID = identification
 mg/kg dw = milligrams per kilogram dry weight
 mg/kg OC = milligrams per kilogram, organic-carbon normalized
 MLLW = mean lower low water
 NA = Not analyzed
 OC = organic carbon
 PCB = polychlorinated biphenyl
 SMS = Sediment Management Standards, WAC 173-204
 SQS = Sediment Quality Standards
 TOC <0.5% = OC concentration less than 0.5 percent; normalization not appropriate
 TOC >4% = OC concentration greater than 4 percent; normalization not appropriate
 TSCA = Toxic Substances Control Act, 15 USC (C. 53) 2601-2692
 USC = United States Code
 WAC = Washington Administrative Code